

HIGHTECH FORUM

Sustainability in the innovation system

A discussion paper from the High-Tech Forum*

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Sustainability as a guiding objective of research and innovation policy

In global terms, Germany is a minnow, accounting for only around one percent of the world's population. In terms of per capita consumption of resources, however, Germany is a giant.¹ As the world's fifth-largest economy, Germany has a responsibility to ensure that the planet remains livable for future generations.² Yet many of the measures to tackle the major challenges of our time do not amount to much more than individual efforts. A focal point of the German federal government's High-Tech Strategy 2025 is addressing societal needs in the form of four missions for sustainable development. However, there is no master plan yet for the development and implementation of sustainable solutions.

Germany's sustainability policy is based on the United Nations 2030 Agenda for Sustainable Development,³ which seeks to reconcile the pursuit of prosperity and of economic progress with social justice and environmental sustainability. Germany's National Sustainable Development Strategy provides a political framework for the implementation of the United Nations 2030 Agenda.⁴ It places a special emphasis on climate protection. The German federal government adopted the Climate Action Plan 2050 to implement the Paris Agreement, the prime objective of which is to hold global warming at well below 2°C above preindustrial levels.^{5,6} The German federal government has also pledged to achieve

greenhouse gas neutrality for Germany by 2050. To this end, the government has defined milestones and specific targets for individual sectors. By the end of 2020, for example, greenhouse gas emissions are to be reduced by at least 40 percent compared to 1990. Although a 35 percent reduction had already been achieved by 2019, forecasts indicate that the 2020 target will not be met.⁷ Similarly, other key targets in the areas of environmental protection and nature conservation will also be missed.

Public perception often overlooks the fact that sustainability covers a number of dimensions – not only the ecological but also the economic and the social. For this reason, the High-Tech Forum prefaces this discussion paper with a key demand that sustainability in all its dimensions become the guiding objective of research and innovation policy (R&I policy), and that, at the same time, barriers to sustainable innovation be removed.

This paper considers the role and responsibilities of politics, business, science and civil society as well as their contribution to sustainable innovation. In concrete terms, the aim is to enable greater innovation for sustainability and, at the same time, to mainstream sustainability in the innovation system.

Levers to achieve greater sustainability in the innovation system

Politics and industry

- Increase mission orientation
- Dovetail strategies
- Leverage public procurement
- Open up government
- Incorporate European perspectives
- Factor in external costs
- Establish alternative prosperity indicators
- Dismantle unsustainable structures
- Include finance and insurance sectors
- Mobilize venture capital

Civil society

- Establish public participation
- Promote participation to strengthen mission implementation
- Increase use of living labs



Research

- Spark innovations for the circular economy
- Step up bioeconomy research
- Fund research for the transition to sustainable farming
- Promote innovation for low-CO₂ manufacturing

Science and education

- Broaden the definitions of performance and excellence
- Anchor sustainability principles and codes
- Step up communication, coordination and collaboration
- Make education in sustainability an interdisciplinary topic



Fig. 1: Summary of the recommendations of this discussion paper.

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Politics and business

Technical, socioeconomic and cultural innovations offer immense opportunities to meet the global challenges associated with sustainable development. The research, development and dissemination of sustainable innovations in particular should therefore be supported. A key challenge here is to consider the diversity of sectors and needs as part of a systemic transformation. The task of politics is to mediate between divergent perceptions relating to the triad of ecological compatibility, economic competitiveness and social cohesion – and to establish, on the basis of these goals, framework conditions in accordance with agreed European and international targets. It is only when technical and social innovations – the latter defined as forms of behavioral change – are promoted together that it will be possible to successfully unify all the various dimensions of sustainable development.

Increasing the use of mission-oriented research to align R&I policy with sustainability goals:

The 12 missions of the High-Tech Strategy 2025 represent a new instrument of innovation policy. Their implementation should be consistent and better coordinated between the involved departments of federal government. For the majority of these missions, there is no clear formulation either of the desired direction of change nor of the precise levers within the system by which this change can be effected. Sustainability has to be a key criterion of any impact assessment. Realization of the mission “Putting artificial intelligence into practical application,” for example, is not just about answering the question of how to disseminate the technology (business) or the question of whether machine learning consumes an excessive amount of energy (ecology).⁸ Rather, it requires a holistic approach that considers sustainability in all its dimensions, including the potential for algorithmic bias and discrimination through the use of artificial intelligence (social).^{9, 10, 11}

Dovetailing high-tech strategy and sustainable development strategy:

Given its focus on specific missions, the High-Tech Strategy 2025 only implicitly addresses the sustainable development goals (SDGs) of the United Nations. Systematic incorporation of sustainable development goals in the High-Tech Strategy 2025 would strengthen the implementation of Germany’s National Sustainable Development Strategy. In the search for technological and social innovations, the aim should be to encourage substantially greater cooperation between the different communities operating in the spheres of technology, economy and ecology, many of which still act in isolation from one another.¹² This will mean strengthening the links between the various groups and forging new alliances along the value chain. Yet the two strategies provide merely a framework for targeted action. In order to expedite their implementation, it is also vital to ensure that projects are systematically planned and all available resources utilized. At the same time, any barriers in the way of implementation should be removed.

Leveraging public procurement for the development of sustainable innovation:

Public procurement accounts for some 15 percent of GDP.¹³ If the public sector’s purchasing power is used for the procurement of innovative, sustainable products, this can create an effective tool for promoting sustainable innovations that are already available on the market.¹⁴

However, this requires more than just a definition and mandatory application of sustainability criteria for the procurement of existing products. In addition, public procurement should be involved at an earlier stage, helping to initiate the development of innovative and sustainable product concepts.¹⁵ This is an area in which Germany needs to catch up with other countries. One approach here would be to provide progressive support for innovative ideas that are not yet available on the market. Funding strategies such as pre-commercial procurement (PCP) and public procurement of innovative solutions (PPI) point in the right direction.¹⁶ It is recommended that, as instruments of R&I policy, such measures be geared more closely to sustainability goals in future.

Opening up horizontal and vertical collaborations at state level:

In seeking to open up horizontal collaboration of policymaking on the federal state level, the German federal government has established an interministerial committee of permanent state secretaries for the coordination of the High-Tech Strategy 2025. In addition to this key advisory body, there is recognition that government innovation labs focusing specifically on the topic of sustainable development could play a highly effective role in facilitating interdepartmental coordination.¹⁷ Such bodies can provide strategic foresight and develop prototypes of solutions for sustainable development.

In terms of horizontal collaboration, there is likewise a recognition that state platforms are regarded as extremely effective in promoting interdepartmental coordination.¹⁸ The idea of the “government as platform” (“l’état plateforme”) rests on the establishment and use of collaborative digital infrastructures for solving common problems.^{19, 20, 21} These infrastructures help ensure that such problems are addressed more rapidly and effectively and with greater participation. And they help overcome the limitations of traditional institutions and promote greater interconnection and interaction between all levels of government and civil society.

In addition to the horizontal, it is also necessary to open up the vertical collaboration at state level throughout the innovation process. To ensure better and quicker upscaling of good practice approaches on the local and regional level,

the establishment of innovation labs along the lines of the UNDP accelerator labs and the Franco-German forum for the future is recommended.^{22, 23} There is also a need for international strategies to help disseminate innovations in the field of sustainable development. Such strategies include, in particular, capacity development in regions such as Eastern Europe, Africa and Asia.^{24, 25}

Incorporating European perspectives: The German presidency of the Council of the European Union provides the German federal government with an ideal opportunity to inject new momentum into the EU's sustainable development policy and to support the European Commission's European Green Deal. Germany's presidency of the Council of the European Union should see the adoption of a new EU framework program for research that is explicitly committed to sustainability goals and in receipt of substantially improved funding. Adoption of the new framework program is a key political condition for greater innovation in the interest of sustainable development. Every effort should therefore be made to achieve its endorsement.

Promoting sustainable behavior through "true cost" accounting: A major lever for encouraging sustainable innovation at the heart of human economic activity is the rigorous internalization of all external costs. Recent discussion has focused on true cost accounting, which takes account of business activity's economic impact on the environment and society. Carbon pricing in particular has a significant influence. Its economic, ecological and social impact should therefore be quantified.²⁶ The creation of a robust and internationally effective framework governing both the internalization of external costs and the degree of that internalization would provide a complex but also vital instrument for rendering sustainable innovation more competitive. In order to create "true cost" business models, however, these must be based on fully transparent external costs of products.

Establishing alternative indicators of prosperity: A model of prosperity that focuses exclusively on economic growth largely ignores ecological and social impacts.²⁷ Gross domestic product (GDP) is inadequate as the sole metric of social prosperity, since it does not sufficiently reflect the contribution that intangible innovations can make to the common good.²⁸ If the concept of prosperity is redefined to include the factors of sustainability and quality of life, GDP is not a suitable metric as it does not depict the negative impact of economic activity.²⁹ In 2014, a German parliamentary commission of inquiry on the subject of growth, prosperity and quality of life produced a catalog of indicators for the measurement of prosperity. This proposed an enlarged definition of GDP to include not only material prosperity but also social inclusion and ecology.³⁰ These indicators are now included, among others, in the monitoring process for Germany's National Sustainable Development Strategy.³¹ However, the status report lacks concision and has therefore failed to generate the requisite public response. A better example of how to achieve this is to be found at the How's Austria? page of the Statistics Austria website, which regularly presents an additional set of indicators alongside GDP.³² The High-Tech Forum believes that a broad scientific and public dialog on

the quality of life and its defining characteristics is a lever that should be used much more frequently as a means of stimulating sustainable innovation.

Phasing out unsustainable structures so as to enable faster diffusion of sustainable innovation: Two-thirds of all innovations in the environmental sector remain niche applications.³³ Any sustainable R&I policy must therefore also address the diffusion of new technology. Similarly, the phasing out of unsustainable structures, processes and practices – a process also known as exnovation – may well be necessary in order to create room for an upscaling of new and more sustainable products.³⁴ The controlled phasing out of unsustainable structures should be used in a more targeted manner so as to accelerate the diffusion of sustainable innovations.

More exnovation is required in order to facilitate the transition to a sustainable system of mobility. Vehicle manufacturers must switch to carbon-neutral drive systems and expand the requisite charging and fuel-supply infrastructure, but this is still not enough. It requires a holistic concept of intermodal transport that takes the life cycle assessment approach. This includes the mass balance of drive systems and recycling, especially in battery production.³⁵

Leveraging the financial and insurance sectors: Equity markets and the insurance sector are only just beginning to reward sustainability on the part of corporations.³⁶ Investment in sustainable and innovative structures and processes is still not honored to a sufficient degree. While sustainability indexes are now a standard feature of stock markets, sustainable business models are not always immediately recognizable to investment funds and private trusts.³⁷ Standards must therefore be developed in order to facilitate capital investment that promotes sustainable innovation. The proposed EU classification system for sustainable investment marks a step in the right direction. This will help track capital investment in sustainable commercial activities and curtail the greenwashing of unsustainable financial products as "sustainable."³⁸ The Value Balancing Alliance is a cross-industry initiative that has developed and piloted a model for measuring the impact of corporate activity on the environment, society and the economy.³⁹ Over on the demand side, the reduction of unsustainable public investment – divestment – remains a key lever that should be used to greater effect.⁴⁰ In view of these major challenges facing society, the global insurance sector should also look to adapt its business models and reward sustainable activity – with, for example, reduced premiums – in order to protect its own interests and avoid the risk of commercial failure.^{41, 42}

Mobilizing venture capital for sustainable start-ups: The mobilization of venture capital for start-ups has already been discussed in the High-Tech Forum.^{43, 44} The establishment of the Future Fund by the German Federal Ministry for Economic Affairs and Energy marks a step in the right direction.⁴⁵ However, there is still too little venture capital available for those start-ups that are not specifically geared toward achieving high profits but rather work on a low-profit basis with the aim of making a positive environmental or

social contribution. There is a proposal to set up a separate fund for this purpose, modeled on the High-Tech Gründerfonds (HTGF), or a sub-fund of the latter, for investment exclusively in sustainable activities according to criteria specifically tailored to this purpose.

3 Research

The High-Tech Strategy 2025 includes four sustainability missions that aim to limit the anthropogenic impact on the global ecosystem: “Creating sustainable circular economies,” “Achieving substantial greenhouse gas neutrality in industry,” “Preserving biological diversity” and “Substantially reducing plastic discharged into the environment.” The following are a list of the fields of research that have the potential to bring about a successful implementation of each mission.

Accelerating the transition to circular economies: The targeted annual increase in overall raw material productivity of 1.5 percent defined in the High-Tech Strategy 2025 will require innovation to enhance efficiency-based approaches and the systemic linking of processes. In order to restructure the economic model from a linear to a circular one, all the various actors along the value chains will have to cooperate.⁴⁶ To this end, greater connectivity should be promoted and innovative alliances forged between the different fields (raw materials production, process optimization and recycling). A road map to a circular economy – currently being drawn up in a project scheduled to run until 2021 –⁴⁷ is a key element with which to effectively accelerate this transformation.

For the waste management industry, there is big potential for improvement in the area of sustainability. In line with the principles of the waste hierarchy, recycling should be used in order to recover valuable resources in those areas where it is impossible to avoid waste or to reprocess it. Innovation and investment in new technology can help improve the collection, sorting and recycling of waste so as to enable the recovery, wherever possible, of high-grade recycled materials. In addition to the development of new technology by businesses, the legal recognition of new recycling processes for all waste streams will be a key factor in helping unlock investment. In the field of plastics recycling, the chemical and plastics industries are currently investigating options for chemical recycling. Here, the High-Tech Forum recommends the promotion of technology-neutral innovation. The most sustainable method should be given preference.

Making greater use of renewable raw materials: The bioeconomy is defined as the production, development and utilization of biological resources, processes and systems with a view to delivering products, processes and services for all sectors of industry within a sustainable economy. It has the potential to provide new and innovative products and processes that will conserve resources and generate prosperity.⁴⁸ A bioeconomy geared toward global sustainability goals points the way to a future without fossil fuels. Yet its

significance is far greater than merely being a strategy for replacing oil. The bioeconomy must be part of any decarbonization and climate protection strategy.⁴⁹ With the launch of its National Bioeconomy Strategy, the German federal government is moving in the right direction.⁵⁰ Promotion of the bioeconomy should therefore be vigorously pursued. This includes adequate provision of research funding and a focus on the industrial application of innovative technologies designed to reduce the ecological footprint.

Initiating the transition to sustainable agriculture: We are on the cusp of a major transformation of agriculture, forestry and the management of water resources, with a reappraisal of agricultural subsidies and the use of pesticides and fertilizer also on the horizon. In particular, the food industry is now facing growing pressure from consumers and society. Debates on the use of glyphosate, insect conservation and animal welfare standards have given new momentum to agricultural issues. In the transition to sustainable agriculture, digitalization and precision agriculture offer big opportunities to develop more socially acceptable forms of land use while simultaneously reducing the negative environmental impact. At present, however, a systematic approach for sustainable land use in agriculture is lacking.⁵¹ Societal and political debate on this issue has intensified in recent times.^{52, 53}, and more and more people regard nature and wildlife conservation as being intrinsic elements of the common good. We should exploit this window of opportunity in order to press ahead with the transition to sustainable agriculture, including a review of the role that rural areas play in supply and waste management.

Promoting innovations to cut greenhouse gas emissions for industrial manufacturing: In order to achieve the goal of greenhouse gas neutrality for industrial manufacturing in Germany, radically new technologies are needed, along with innovative storage and automation systems. This includes not only smart grids and the use of artificial intelligence for sector coupling but also power-to-X solutions, carbon capture technology and the establishment of a hydrogen economy in Europe. A key condition of such innovation is

the ready availability of electricity from renewable energies at competitive prices. This can be achieved by creating framework conditions for fair competition, such as the internalization of external costs. Living labs can also play an essential role in facilitating the mix of public participation and regulatory consultation that should accompany the introduction of new technology.⁴³

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Science and education

Science and education play a key role in high-tech innovation, particularly in the domain of sustainability. The history of science shows that invention and innovation can only be steered to a certain degree. Both require space to emerge and the right social framework. Given the complexity and interdependence of individual sustainability goals, systemic and transformative methods of research, teaching and technology transfer as well as new forms of participation should be encouraged. The task here is to conduct a knowledge-based investigation of potential courses of action and their future impact. New technologies for enhanced cooperation and for living labs, simulation of future scenarios and, in particular, knowledge transfer and scientific dialog need to be strengthened. This calls for the supplementing of structures and incentives within the existing education and science system – including application procedures – in such a way that they fully meet the challenges of the present.

Supplementing new incentives and structures in science – broadening the concept of excellence: In 2015, the German Council of Science and Humanities produced a well-received paper with recommendations on how science policy should deal with the grand challenges facing society.⁵⁴ One proposal was to discuss broadening the concept of excellence and performance. Initiatives such as Sustainability in Science (SISI), which is part of FONA, Germany's framework program for research into sustainable development.^{55, 56} are setting a precedent and are already bearing fruit in projects such as LeNa, HOCH-N and Netzwerk n e.V.^{57, 58, 59} The eight criteria of the LeNa framework for reflection on socially responsible research are as follows: ethics, transparency, user focus, interdisciplinarity, transdisciplinarity, complexity and uncertainty, an integrative approach, and a reflection on impact.⁶⁰ All stem from questions regarding how, with whom, and for whom research is conducted. This perspective should be more firmly anchored in those areas of scientific practice where targets are set with respect to the social impact of that practice. Similarly, greater support is required for projects in systemic and transdisciplinary fields of research.

Anchoring sustainability guidelines and codes in scientific practice: Universities and nonuniversity research organizations are already grappling to varying degrees with the idea of sustainability as a guiding principle and with the implementation of SDGs. Following completion of initial trials, the draft submitted by HOCH-N for the application of a university-specific sustainability code is to be incorporated in an overall guideline for sustainable development at universities in 2020.⁶¹ This should be applied thoroughly and without delay and be subject to continuous review by means

of participatory processes. There are already a great many networks of scientists and students busy developing proposals about how to make sustainable practice an integral part of scientific activities in areas such as mobility, construction, digitalization, energy and food production. There is a big demand, for example, for green computing – information and communication technology that is environmentally friendly and conserves resources throughout its entire life cycle. The new federal government Agency for Breakthrough Innovations is the recommended partner for the funding and support of innovation in the field of sustainable development.⁶²

Strengthening communication, coordination and cooperation in the promotion of sustainable innovation: There are various actors and scientific institutions involved in the development of innovations for greater sustainability and in the transfer of such knowledge. For this reason, there should be greater coordination between all of them. The establishment of Science Platform Sustainability 2030 already marks a decisive step in this direction.⁶³ Similarly, the incorporation of the position of sustainability coordinators at scientific institutions is also to be welcomed. However, their role ought to be strengthened through the definition of clear responsibilities. At the same time, additional human resources and infrastructural capacity should be created in order to pool existing initiatives and expertise, strengthen cooperation and accommodate various approaches and requirements.⁴⁰

Science communication, as an essential element of public dialog, should be promoted as an additional service that extends beyond professional recognition and reputation.⁶⁴

Integrating education for sustainable development as an interdisciplinary topic – using intellect: In 2020, the UNESCO Global Action Program on Education for Sustainable Development will focus explicitly on the realization of the sustainability goals of the United Nations 2030 Agenda.⁶⁵ This underscores the relevance and urgency of this topic. Education in sustainable development should therefore be anchored at all levels of the education system as an interdisciplinary topic. Furthermore, this should include strategies to promote international cooperation and capacity

building. It is recommended that further implementation be supported by a national action plan that aims at greater promotion and broader anchoring of this topic, especially within the curricula of higher education. At the same time, further interdisciplinary research into the cognitive skills (e.g., abstraction, planning and problem-solving) required for a knowledge-based transition to sustainability should be carried out and promoted through education in all phases of life.⁶⁶

5 Civil society

Sustainable development requires innovation; innovation requires creativity, space and a framework to promote it. The moves toward achieving greater sustainability in the innovation system are too complex, too urgent and too profound to be performed by a single actor. This requires all the relevant actors in the innovation system – politics, business, science and civil society. A comprehensive change in culture is necessary in order to establish the behavior and attitudes required to anchor sustainability within society as a transformative goal. European and international cooperation will continue to play a key role in creating the conditions to promote this and ensure it becomes rapidly effective.

Using participation to communicate the opportunities of a transition to sustainability: Local actors face a variety of challenges as a result of the transition to sustainability. These challenges are complex and impact substantially the everyday lives of many citizens. It is therefore necessary to ensure that citizens can play an active part in the transition process. This conveys self-efficacy and wins trust, both of which are crucial if innovation is to become effective (citizen science). The government-sponsored participatory process for the further development of the High-Tech Strategy 2025 provides initial steps as to how citizens can play an active part in this transition. This initiative includes the staging of events on the topic of sustainability in economically disadvantaged regions. Above and beyond this kind of informative and consultative participatory process, however, there is still a lack of broader forms of public participation such as the establishment of citizens councils or similar bodies, equipped with a specific mandate.⁶⁷ The link between public participation and political implementation should be clear and cogent. Bodies such as the Convention Citoyenne pour le Climat in France or Climate Assembly UK in the United Kingdom point the way and offer a possible model for adoption by Germany.^{68, 69}

Using participation to promote implementation of the missions laid out in the High-Tech Strategy 2025: Numerous projects show how sustainability can become an integral part of research. Behind the idea of responsible research and innovation (RRI) lies the question as to which goals innovation should serve.⁷⁰ The promotion of sustainability in the interest of the common good is a key element of responsible research and innovation, as is the participation

of social actors throughout the entire process. The German Federal Ministry of Education and Research (BMBF) has institutionalized processes of responsible strategic foresight in the form of impact assessments conducted in line with the Innovation and Technology Analysis (ITA) program and in the consultation provided by the BMBF's Future Committee.^{71, 72} The High-Tech Forum recommends that the current focus on societal needs should become an integral part of the implementation and realization of the High-Tech Strategy's missions.

Making greater use of living labs to remove barriers to sustainable innovation: Living labs are a fundamental innovation increasingly used in the context of sustainable development. They facilitate an agile development and refinement of the regulatory framework, involving all stakeholders, at an early stage of technology development. In providing low-threshold opportunities to test, explore and gradually become acquainted with a new technology, living labs can significantly enhance the quality and subsequent diffusion of that innovation. The High-Tech Forum therefore recommends greater promotion and use of living labs of varying sizes for the realization of sustainability goals. In particular, this applies to the proposed financial assistance with operating costs (OPEX) that will enable successful projects to continue operating after the end of investment grants.⁷³



Annex

Examples of good practice

Below are the examples of good practice for the promotion of sustainable innovation nominated at the expert workshop on “Sustainability in the innovation system,” which was held on January 20, 2020. Three examples were identified for each area.

| | | Thumbnail description | Website |
|--|--|---|--|
| Society | | | |
| Netzwerk Bürgerbeteiligung | | A network for public participation in the sphere of sustainability | www.netzwerk-buergerbeteiligung.de |
| Bits & Bäume | | Movement to connect actors in the fields of digitalization and sustainability | www.bits-und-baeume.org |
| Citizens assemblies on climate change | | Participatory bodies for the common development of measures to combat climate change | www.conventioncitoyennepourleclimat.fr www.climateassembly.uk |
| Policy | | | |
| Brainergy Park Jülich | | Business park and communication platform for demonstrating future methods of energy management | www.brainergy-park.de |
| Territoires d'innovation de grande ambition (TIGA) | | Support for sustainable private-public innovation from France's national development bank | www.gouvernement.fr |
| UNDP Accelerator Labs | | Learning networks for sustainable development | www.acceleratorlabs.undp.org |
| Business | | | |
| Werner & Mertz | | Incorporating sustainable business practices in the corporate model | www.werner-mertz.de |
| Soil & More | | Consulting for companies on true-cost accounting and resilient procurement networks | www.soilandmore.com |
| J. Schmalz GmbH | | Implementation of a holistic approach to sustainability | www.schmalz.com |
| Science | | | |
| Living Lab Energy Campus (LLEC) | | Platform for the development of energy supply systems | www.fz-juelich.de/llec |
| EIT Climate-KIC | | Identification and promotion of climate-friendly innovation | www.climate-kic.org |
| Science Platform Sustainability 2030 | | Forum for science to engage with politics, industry and civil society on issues in the field of sustainability policy | www.wpn2030.de |

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About this discussion paper

The committee discussed and commented on this discussion paper at a meeting of the High-Tech Forum on March 11, 2020. It does not represent a unanimous decision of the committee.

The positions presented in this paper do not necessarily reflect the views of the German federal government.

This discussion paper was produced by the High-Tech Forum team appointed to work on the topic “Sustainability in the innovation system.” Its purpose is to advise German federal government on the implementation of the High-Tech Strategy 2025. The team comprises the following members: Prof. Antje Boetius (spokesperson), Dr. Martin Bruder Müller, Prof. Wolfgang Lücke, Prof. Patrizia Nanz, Johannes Oswald and Julia Römer.

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